Molex/SDP – 5G Isolators/Circulators

September 3, 2019

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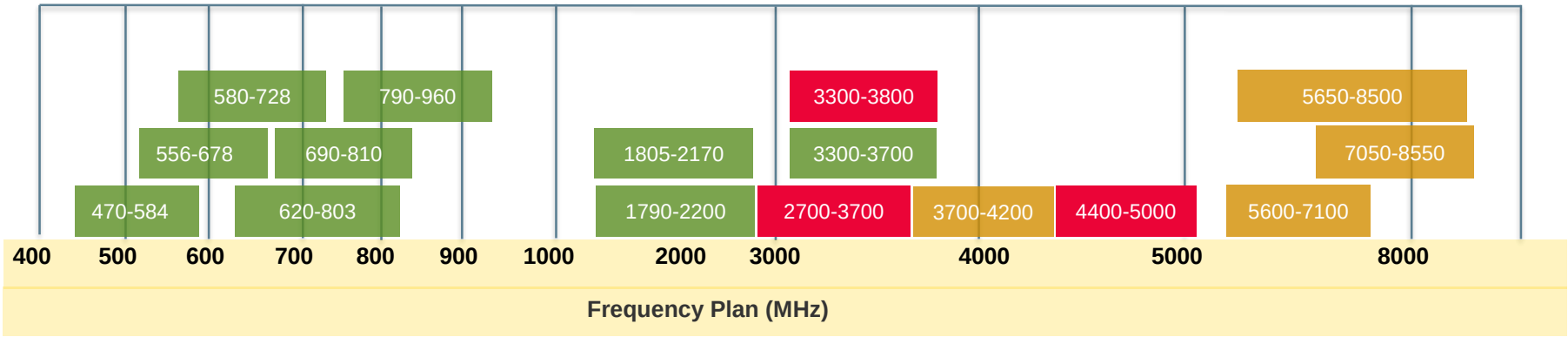
Existing Frequency Coverage of WB Solutions



In Production

In Development Stage, Samples sent to customer

In Development

- Devices are typically more than 15 % bandwidth
- They mostly cover two or more LTE/5G bands

SMT Isolators for 5G bands

- Traditional “fixed pin” Strip line solutions available in limited versions to 15 GHz (approaching upper frequency limits of this structure type)
- Adopting “embedded ferrite” structures for 15 GHz and above


23 GHz


26 & 28 GHz


39 GHz

2019

2018

2017

2016

3 GHz | 5 GHz | 10GHz | 15 GHz | 20 GHz | 40 GHz

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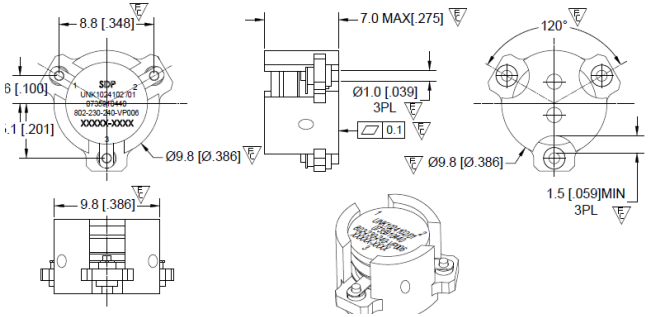
10mm Circulator Format

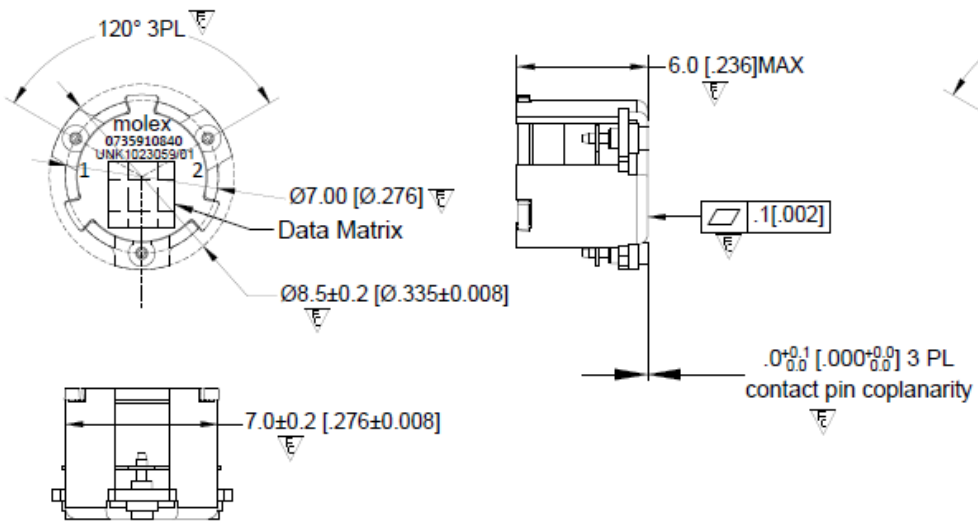


	Start Freq. (MHz)	Stop Freq. (MHz)	Return Loss (dB)	Isolation (dB)	Insertion Loss (dB)	IMD (dBc)	Temp Range (°C)
5G sub 6 GHz Europe	3600	3800	22	21	0.25	-60	-40~105
5G sub 6 GHz China	3400	3600	22	21	0.25	-60	-40~105
5G sub 6 GHz China	3400	3800	20	20	0.3	-60	-40~105
5G sub 6 GHz China	4400	4500	22	21	0.25	-60	-40~105
5G sub 6 GHz China	4800	5000	22	21	0.25	-60	-40~105
5G sub 6 GHz Korea	3400	3700	21	20	0.25	-60	-40~105
AAS B40	2300	2400	22	21	0.25	-60	-40~105
AAS B41	2496	2690	20	20	0.3	-60	-40~105

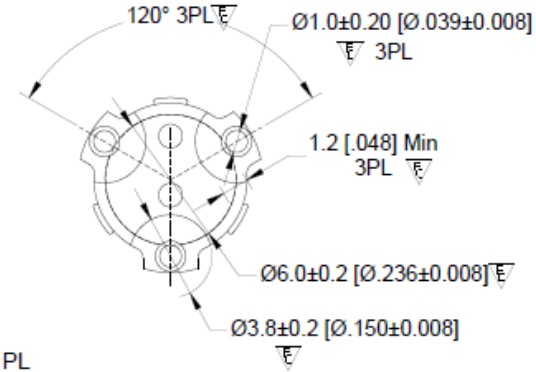
Production | Development

7mm Circulator

- Small size circulator



Typical Mechanical Outline



Physical Sample

7mm Circulator Electrical Performance

- Major Bands between 2.3 GHz to 6.0 GHz are available or under development

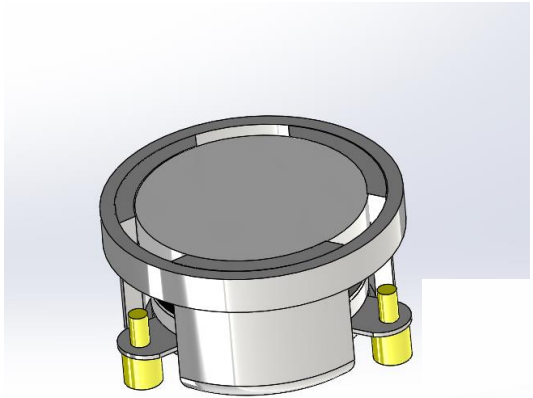
	Start Freq. (MHz)	Stop Freq (MHz)	Return Loss (dB)	Isolation (dB)	Insertion Loss (dB)	IMD (dBc)	Temp Range (°C)
5G sub 6 GHz Europe	3600	3800	20	20	0.35	-60	-40~105
5G sub 6 GHz US	3550	3700	20	20	0.35	-60	-40~105
5G sub 6 GHz China	3400	3600	20	20	0.35	-60	-40~105
5G sub 6 GHz China	3400	3800	18	18	0.4	-60	-40~105
5G sub 6 GHz China	4400	4500	20	20	0.35	-60	-40~105
5G sub 6 GHz China	4800	5000	20	20	0.35	-60	-40~105
5G sub 6 GHz Korea	3400	3700	20	20	0.35	-60	-40~105
AAS B40	2300	2400	20	20	0.35	-60	-40~105
AAS B41	2496	2690	18	18	0.4	-60	-40~105

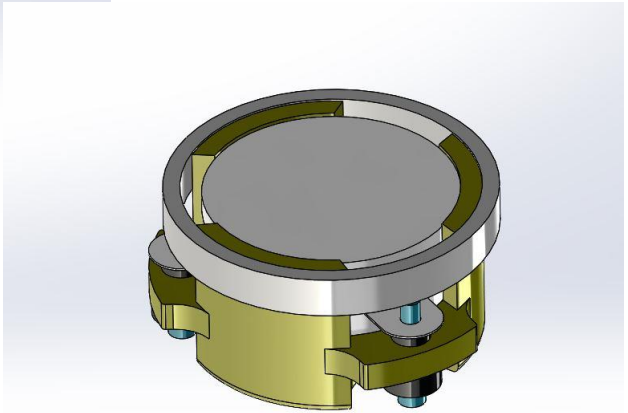
Production | Development

SMT Isolators for 5G Bands
7mm Low Profile Circulator

Circulators at 2.6 GHz, 3.5 GHz and 4.7 GHz frequency bands - Ø7.0×4mm

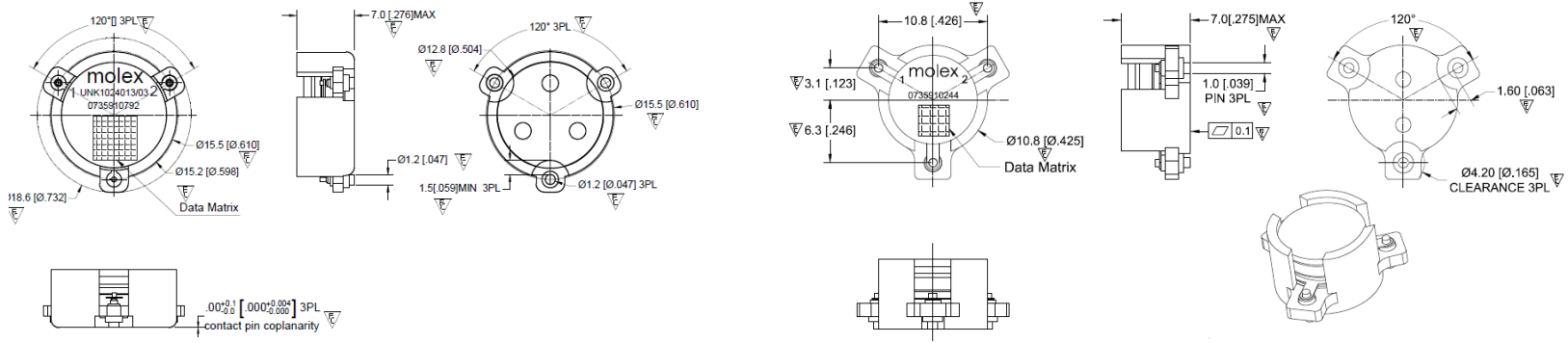
Samples shipped in Q2 2019





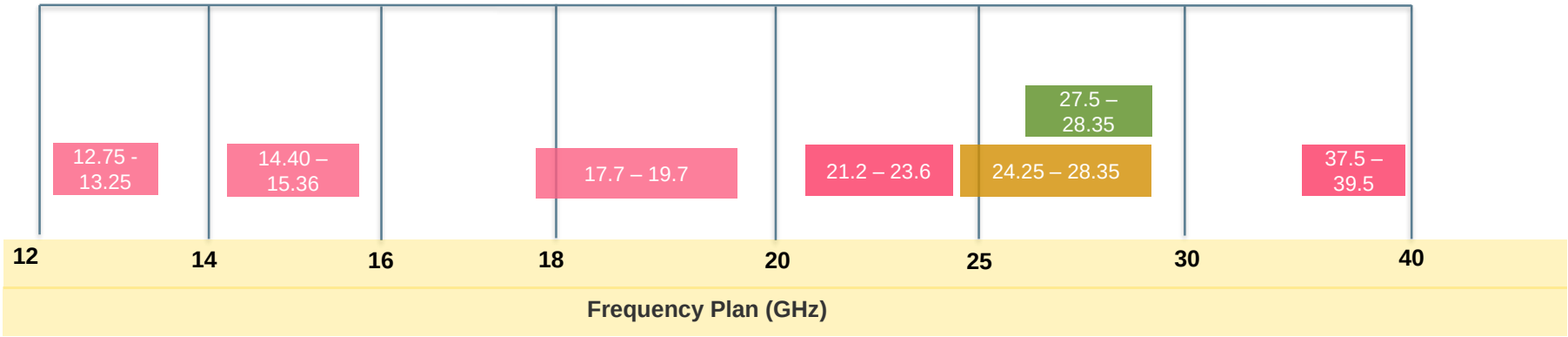
AAS WB Circulators

Size (mm)	Start Freq. (MHz)	Stop Freq. (MHz)	Return Loss (dB)	Isolation (dB)	Insertion Loss (dB)	IMD (dBc)	Temp Range (°C)
7	3300	3800	16	16	0.6	-60 (2*1W)	-40~105
	4400	5000	16	16	0.6	-60 (2*1W)	-40~105
	3400	3800	16	16	0.5	-65 (2*2.5W)	-40~100
8	3400	3800	17	17	0.4	-65 (2*2.5W)	-40~100
10	3400	3800	20	20	0.3	-60 (2*5W)	-40~105
	4400	5000	20	20	0.35	-60 (2*5W)	-40~105
11	2300	2700	18	18	0.4	-62 (2*5W)	-40~105
	3400	3800	20	20	0.3	-62 (2*5W)	-40~105
	4400	5000	20	20	0.4	-62 (2*5W)	-40~105
15	2300	2700	21	21	0.3	-70 (2*5W)	-40~105
	3400	3800	21	21	0.3	-70 (2*5W)	-40~105
	4400	5000	21	21	0.4	-70 (2*5W)	-40~105



Production | Development

Existing Frequency Coverage



In Production

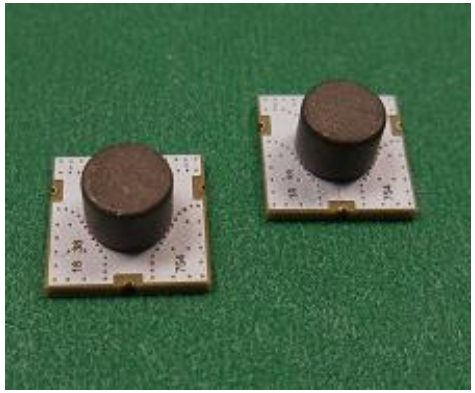
In Development Stage, Samples sent to customer

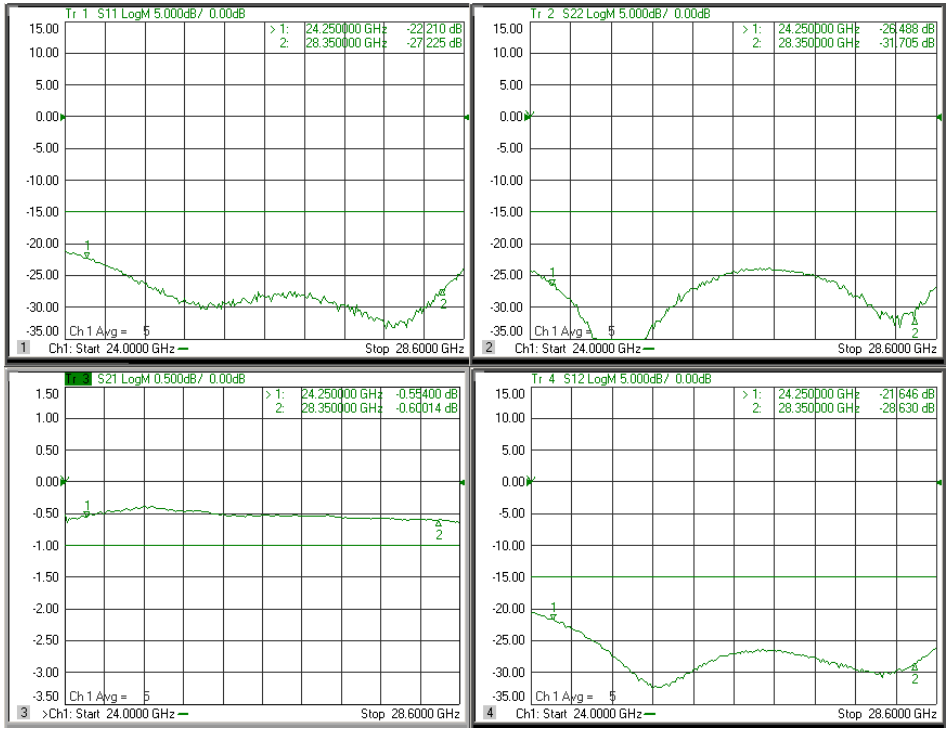
In Development

SMT mm Wave Circulator Experimental Sample Plot

ELECTRICAL SPECIFICATIONS:

FREQUENCY RANGE	24.25 to 28.35 GHz
INSERTION LOSS	1.0 dB, MAX
RETURN LOSS	17 dB, TYP
ISOLATION	17 dB, TYP
TEMPERATURE RANGE	-40 to +85°C
POWER (CW)	up to 5 W



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